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ANIMAL KINGDOM

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ANIMAL KINGDOM

Bulletin of the New York Zoological Society

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Aquarium— *On the March*

As REPORTED in an article in this issue, the new Aquarium is "on the march" and lively plans are now being carried out for its extension and improvement.

Few worthwhile goals are easily reached. Our institution was fully aware of this when it undertook the responsibility of planning and managing the new Aquarium. We knew we were facing many operational difficulties, including the collecting and acclimatizing of many different kinds of marine exhibits, problems such as obtaining good ocean and fresh water supply, temperature control, chemical content of water, and a host of other technical matters. Practically all of these have now been overcome although a system to obtain really satisfactory ocean water of proper clarity has still to be established.

Quite apart from such problems, we were given an additional challenge by the City government, namely, that the Aquarium should be self-supporting; in other words, instead of having its operating costs provided from the public treasury that it should carry itself from admission charges. This plan marks a new step in the administration of quasi-public institutions in the City — the museums, the zoos and the botanical gardens — an experiment which is undoubtedly well worth trying.

The Aquarium is steadily growing in public interest and it is our hope and expectation that the current program of development will go far to establish it firmly as one of the outstanding attractions of New York.

Fairfield Osborn

DOUBLE COVER

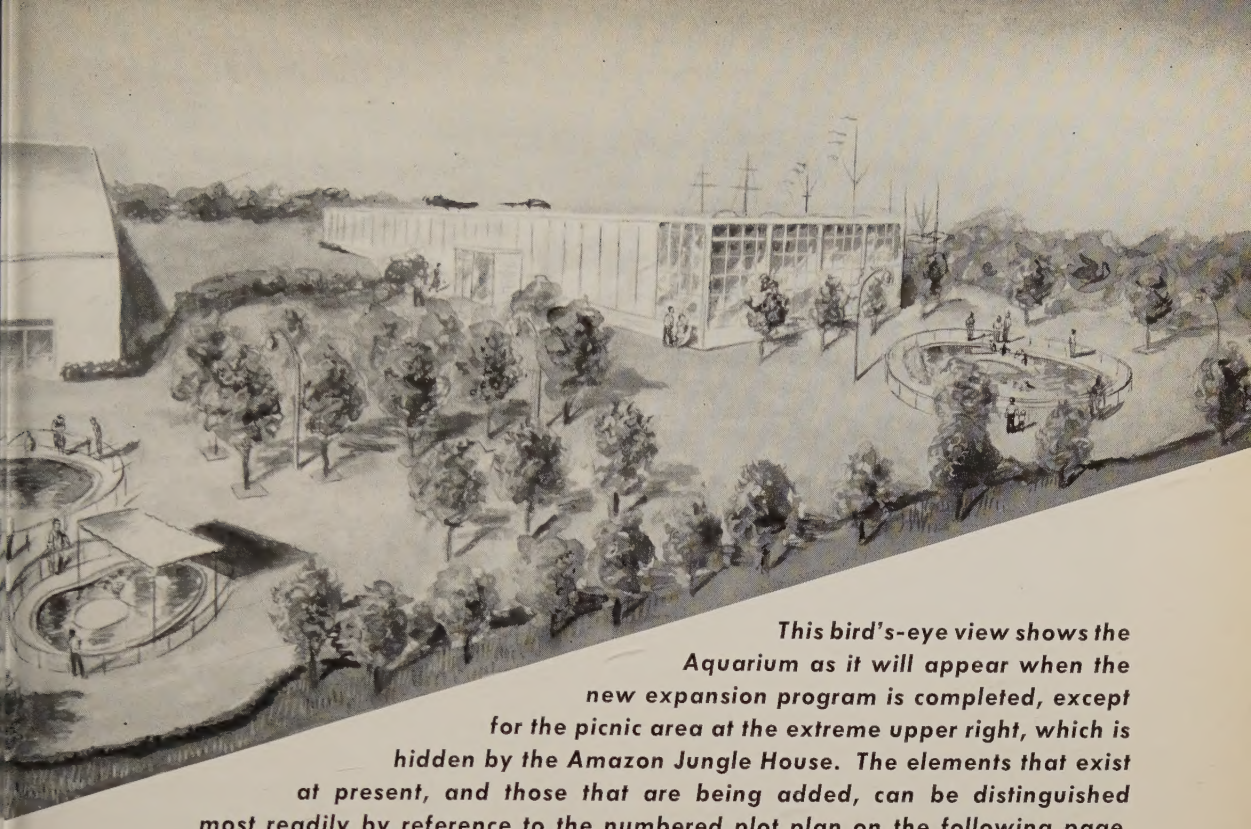
Staff Photographer Dunton turned in two photographs of the Uele Colobus Monkey and her baby, suggesting that one of them might make a cover for ANIMAL KINGDOM. But how to choose between them? The staff debated . . . and debated . . . and decided to use them both, as a front cover *and* a back cover. Incidentally, since these photographs were made the baby which was all white at birth has become progressively darker and now is almost as dark as its mother except for the white cape on its back.

THE AQUARIUM IS GROWING

By Christopher W. Coates

THE YEAR 1959 will be an important one for the New York Aquarium. Early this spring construction begins on a $381,000 program to expand our exhibits and improve our facilities, and early this fall we expect to start work on the installation of a new ocean water filtration system at an estimated cost of $300,000. Visitors will then enjoy four new major displays and many smaller ones as well — all with grea ease and convenience and with increased servi to make their stay an even more pleasurable o

The Aquarium building itself is to be enlarg by the addition of a wing to the east. This w house a Hall of Local Marine Life and a moti picture theatre. New York is a maritime city, a its citizens, as well as tourists from inland pla

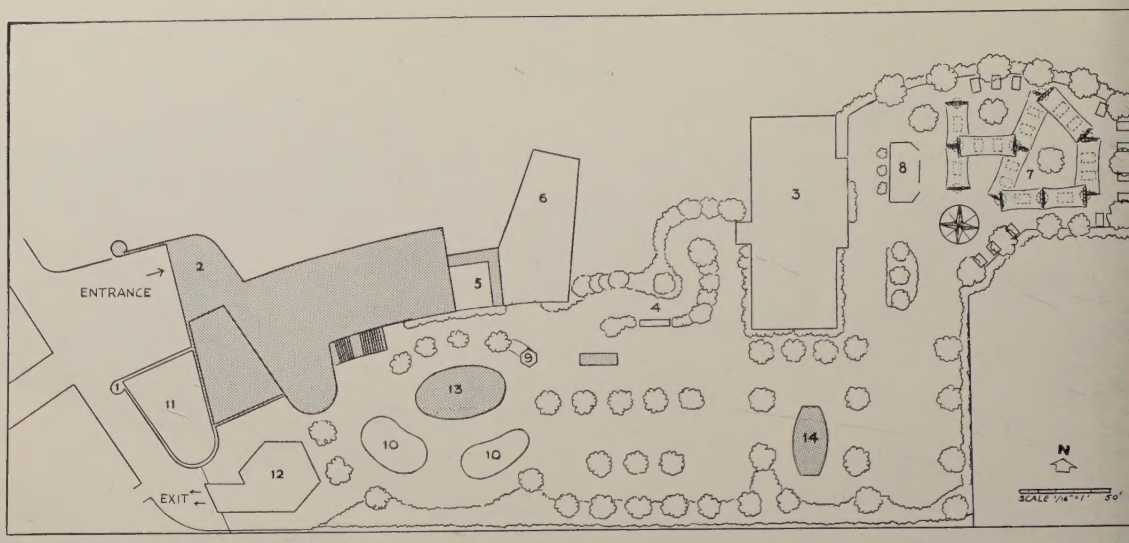


This bird's-eye view shows the Aquarium as it will appear when the new expansion program is completed, except for the picnic area at the extreme upper right, which is hidden by the Amazon Jungle House. The elements that exist at present, and those that are being added, can be distinguished most readily by reference to the numbered plot plan on the following page.

re keenly aware of its docks and ships and land geography. The nearly one hundred spe-ies of fishes – to say nothing of the hordes of ther marine creatures – that inhabit New York larbor and its environs form an essential part f the picture. We feel that it is really our *duty* o exhibit a representative sample of them. Local alt water fishermen, for example, will make this ew hall a Mecca, for they would almost rather ee their favorite sports fish swimming about in tank than on the end of their line! Although nny rarities from the other side of the globe nay receive but a moment's glance from these portsmen, an unusual species from nearby waters xcites no end of interest. Nor can we forget our chool children, Boy Scouts and the like, all of vhom want to know the local fauna.

Having motion pictures as a regular part of our isplay presents such exciting possibilities that ve must confess we can hardly see the end of hem. In any event, we know that the show will e included in the price of admission and that *ne* of its subjects will be the behind-the-scenes ctivities at the Aquarium – collecting specimens, or example. The opportunity to combine educa-ion with entertainment is nothing short of nagnificent.

Up to the present we have had to neglect the fishes and other animals inhabiting fresh water. As marvelous as many of them are, we felt that the various forms of sea life had to be given precedence, since we had only a limited amount of space. Now we shall have our first full-fledged freshwater exhibit, and it is fitting that it should be devoted to the life of the Amazon, the largest of all rivers and containing by far the richest fluviatile fauna in the world – more than a thousand species of fishes. We intend to show some of the most notable ones, such as the giant Pirarucu and Pirahyba, the savage Piranha and the weird Aruana. They will be exhibited in tanks that simulate a section of an Amazonian tributary, under a realistic jungle bank of live plants of many sorts, with bright-colored birds such as macaws, and other appropriate animals – sloths, perhaps. Habitat groups of this type have been very successful in both European and American zoos, but none has ever been tried on the scale we are planning. Our living habitat group will occupy somewhat less than half of an Amazon Jungle House, a building 48 by 120 feet, part of which will be constructed like a greenhouse. The remainder will contain a tremendous tank 40 feet long and 16 feet wide, inhabited by



THE EXISTING AQUARIUM (SHADED AREAS) AND THE EXPANDED EXHIBITS

1. ***Bathysphere***
2. ***Main Entrance***
3. ***Amazon Jungle House***
4. ***Outdoors Tank***
5. ***Hall of Local Marine Life***
6. ***Motion Picture Theatre***
7. ***Picnic Area***
8. ***Food-vending Machines***
9. ***Portable Seal Food Stand***
10. ***Additional Seal Pools***
11. ***Filter System for Oceanic Tan***
12. ***New Souvenir Building***
13. ***Existing Seal Pool***
14. ***Existing Penguin Pool***

a colony of sharks, and a spectacular demonstration of the electrical powers of the Electric Eel. Our present Electric Eel show, which we put on once every hour, has proved so popular that we are forced to move it into more commodious quarters. This will also give us an opportunity to expand the show, making it more amusing as well as instructive.

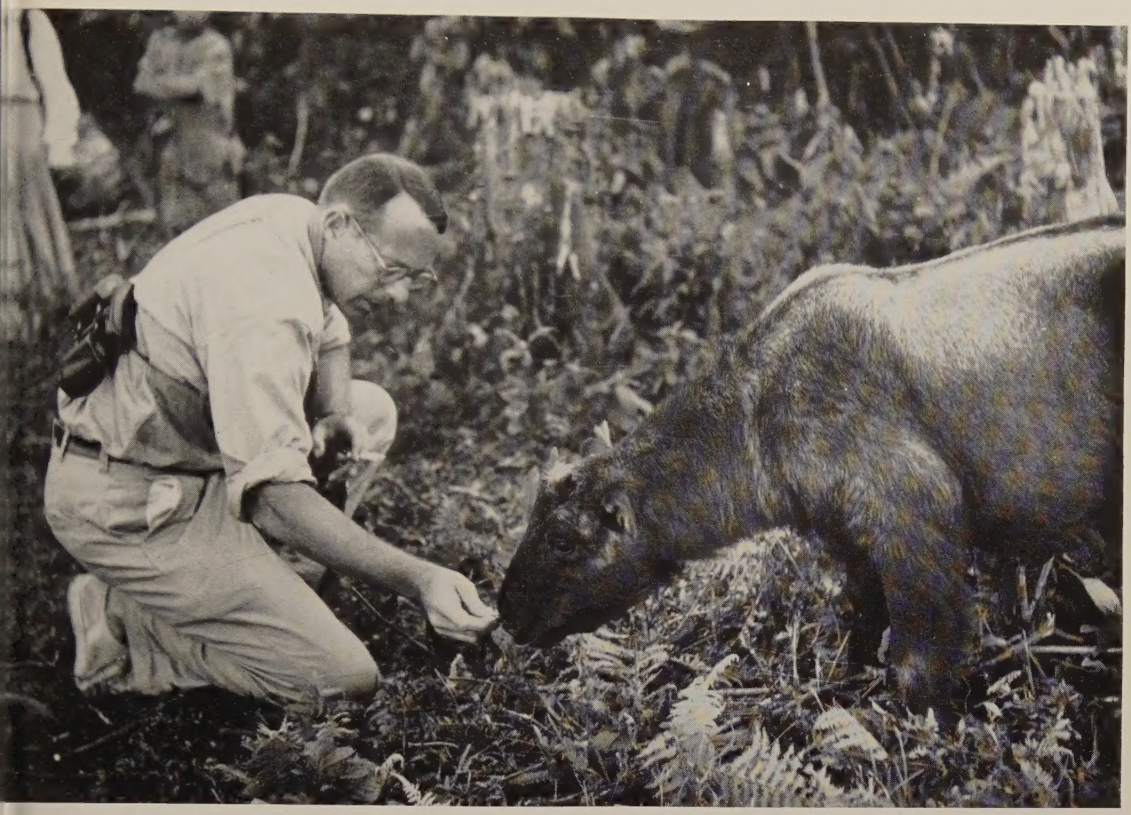
The fourth of our new major displays consists of two outdoor seal pools. These will be combined with our single existing seal pool to form an exhibit whose flexibility will make it possible to more than triple our present collection of pinnipeds. We have always featured our seals, sealions and walruses; the additional pools insure pre-eminence in this field.

One of the main difficulties with our present building is that it soon becomes congested whenever crowds of any size come to the Aquarium. The new displays are all designed to relieve this congestion. To improve the flow of traffic still further, our present lobby, through which visitors may now both enter and leave, is being radically changed. In the future, visitors will only enter the Aquarium at this point, and they will leave at another location not far away but completely separated from our front doors. The souver counter will be relocated, in an attractive ste and-glass building near the new exit.

Other improved facilities for visitors inclu a spacious picnic area, serviced by a small hou ful of vending machines, a public address syst to announce feeding times, demonstrations a the like, and an installation to sell small fish be fed to the seals and sealions.

Finally, a new, specially-designed water syst is to be put into operation. This will provide with another much-needed source of salt wa and will enable us to clarify the water in o Oceanic Tank.

The cost of this water system is being shar equally by New York City and the Zoologic Society. All the remaining exhibits and facilit are being built entirely with Society funds t year. These important changes and additions a based on our own operating experience, especia during the last two years at Coney Island, co bined with the expert advice and planning of t Marco Engineering Company of Los Angel Goldstone & Dearborn of New York, Thomas Riddick of New York and Ebaugh & Goet Inc., of Gainesville, Florida.



There was no trouble about getting very close to the Takin in order to take its photograph. Here Mr. Estes is offering it a bit of food in a field near the Burmese village of Sankawng.

Photo by Oliver M. B. Milton

A VISIT TO OUR FIRST TAKIN

BY RICHARD D. ESTES

THROUGH the good offices of Oliver M. B. Milton and Richard D. Estes, now making a wildlife survey in Burma, the New York Zoological Society is making arrangements to receive the first Takin (Budorcas taxicolor) *ever seen alive in the United States. The animal was captured by hunters from a remote village in Burma and Mr. Milton came upon it unexpectedly in the course of his survey. We have now purchased it and it is being held in Burma until it can be flown to Germany later this spring to undergo 60 days' quarantine at an approved station in Hamburg. An additional 30 days' quarantine will be necessary after it reaches New York. If all goes well, it should go on exhibition in mid-summer.*

The article that follows, about a visit to see the Takin, was written by Mr. Estes and appeared in the Rangoon newspaper, "The Nation," in mid-January.

ON THE FIFTEENTH of January the Burma Wildlife Survey team of Oliver M. B. Milton and Richard D. Estes took the regular Thursday flight from Myitkyina to Putao in order to inspect the young female Takin taken last July by hunters from the village of San-

kawng. Acting on behalf of the villagers, the Kachin State Government had offered it for sale to Mr. Milton, and as the New York Zoological Society had indicated its desire to acquire this rare animal for the world-famous Bronx Zoo, we wanted to make sure it was in good condition, as well as take photographs.

But very little time was at our disposal. To accommodate the numerous headmen from the Putao area who were returning from the great Manau held in Myitkyina, the UBA had added two additional flights, one Thursday afternoon and the third Friday morning. To miss the Friday plane would leave us marooned in Ft. Hertz for a whole week, until the regular plane arrived the following Thursday. In such beautiful country, with rugged mountains on all sides, backed to east, north and west by towering snow peaks — some up to 16,000 feet — which appear and disappear through their shrouds of mist and cloud, this might be considered no great hardship. But as it happened, we had to be back in Myitkyina the next day, and but for the fortuitous addition of the extra flights, we would not have undertaken the trip at this time. With such a tight schedule, one thing was clear: if any pictures of the Takin were to be taken, we would have to reach Sankawng well before dark that afternoon.

When the UBA's DC-3 touched down at Putao it was already nearly one o'clock. By the time we had explained the purpose of our visit to the local authorities and registered with Immigration officials, it was close on to two. Having been told that it was a good three-to-four-hour walk to Sankawng, ten miles to the northwest, it looked as though the chance to get pictures was gone even before we started. However, the Assistant Resident rendered timely assistance by supplying his jeep to carry us through Ft. Hertz as far as Putao, where the road ends, thereby placing us two miles nearer our objective.

Beside a footbridge across the Nam Palak River, we left the jeep shortly after two, and with two young men — one from the village — to carry our gear and lead the way, began the forced march to Sankawng. Fortunately the trail led across the level plains of Hkamti and not the surrounding hills; there was nothing to slow our pace except for the streams and rivers, where we had to take off and put on our shoes each time we crossed. In fact, our progress seemed so rap that each of several villages we reached, ar then passed, raised hope that this was Sankawn With the sun coming nearer and nearer the rir of the hills, our objective still lay hidden in tl forest, until finally, at 4:20, the real Sankawr appeared between the trees. There was st ample light for pictures; indeed, at that mome the sun broke through scattered clouds to light u the whole landscape in rich golden tones.

But, as anyone who takes up the profession wildlife photography soon learns, it seldom ha pens that things turn out just the way you hope The Takin, we now realized for the first tim was allowed to range free with the village cattl and of course it could not be located at the pre ent crucial moment. While everyone scurri around, peering under houses, in thickets ar other odd corners, we were quietly going ma with impatience. Actually, hardly ten minut passed before the Takin was found in a clearir behind the two rows of bamboo-and-thatc houses, but in the interval the sun had dipped b

The young Takin had the run of the fiel the village cattle and apparently was c as the cattle themselves. At night i shelter under one of the houses in the

Photo by R. D. Estes

hind a steep hill that rose immediately to tl west, leaving the valley in deepening shado Nonetheless, the moment we came within rang we began snapping pictures, even though growth of bushes and weeds added to the dif culty of getting a good viewpoint.

It was a startling — and thrilling — sight, come upon one of the rarest and least-know animals calmly grazing with cows, as tame ar seemingly as domesticated as they. It was rath like finding a rare alpine flower blooming in bed of sunflowers. The simile is not inept, f the Takin shares the cold heights where alpi flowers grow, and would never descend to tl lowland of its own accord, nor come close to tl haunts of man. Moreover, its resemblance to tl cattle hardly went further than the fact that too, had four legs and ate grass.

With its head held characteristically lo humped shoulders, sharply tapering hindquarte and thick legs, it looked as much like a mounta

›at as anything else, a resemblance that was eightened by the way it moved, and by the ubs, as yet no more than one and a half inches ng, of its just-emerging horns. However, the lly developed horns are not at all goatlike, but proximate those of the Wildebeeste or "Gnu" East Africa, and those of the Musk-ox. The tter, in fact, seems to be the Takin's closest lation.

Found only in Arctic North America, the lusk-ox too, is an odd beast, but despite the ame "ox," neither it nor the Takin belongs to e bovine family typified by cattle; rather, they gether occupy a special niche in the Subfamily aprinae in which goats and sheep are grouped. do not want to dispute this conclusion, seemgly agreed upon by modern taxonomists, whose usiness it is to classify the different animal ecies, but to both Milton and myself the Roman nose," thick face and prominent ears of is little Takin (calf or kid?), definitely suggested a young moose. In short, a Takin looks like almost anything but a cow.

The general color of this specimen — whether of the sub-species *Budorcas* [*taxicolor*] *taxicolor* or *B.* [*taxicolor*] *tibetana* we do not yet know — was chocolate brown shading almost into black on the face, chin and legs, with a broad saddle of buff spread across the back, and dark dorsal stripe running from shoulders to the short untidy tail. The hair was thick, soft, and quite long. The shiny black hooves, bearing pronounced dewclaws part way up the ankle, were large and strongly curved with a wide gap between, obviously well-adapted to rocky mountainsides. The hooves lend credibility to stories of the Takin's legendary prowess in leaping and climbing the steepest slopes.

After exposing a roll of film each, and fifty feet of motion-picture film, Milton took measurements which showed the Takin's height to be 27 inches at the shoulder, its length 48 inches. As

The general color of the animal is dark brow with a broad saddle of buff across the ba and a dark stripe down center of the bac

Photo by Oliver M. B. Milton

to weight, we concurred in the villagers' estimate of 90 to 100 pounds. Already nine months old, it had a lot of growing to do before it would reach the 600-700 lbs. which Pocock gives as the weight of a mature animal.

After taking a quick dip in the village stream to wash off dust accumulated on the trail, there was still sufficient light to make some further observations of the Takin. In the interim it had moved of its own accord into the compound surrounding one of the houses. Watching it nibble grass from a few feet away, I was able to see that it had well-developed teeth in its lower jaw and none in the upper, but it resisted attempts to open its mouth for a closer examination. Presently it slipped through the bamboo-stake fence into the adjoining compound, and with slow, long strides approached two yearling calves tethered next to the headman's house, where Milton and I had been invited to pass the night. What happened next caused me to regret keenly that the light was now much too dim for picture-taking. Whether in play or genuine aggressiveness, I could not tell, it proceeded to attack the calves.

The first stage, known as threat display, when an animal signals its intention to fight, could in the Takin's case be likened to the way a dog stalks toward a potential rival. Also, goats behave in much the same manner. Its neck held ho zontally, head out and rigid, the little Takin co tinued her relentless advance until she sto between the two yearlings. They, to my amus surprise, gave every indication of fearing the pint-sized antagonist. Backing and plungin they only ceased struggling to escape when the ropes had become so entangled that they had n choice but to stand, breathing hard and starin wild-eyed. Even if cattle and Takin are n closely related, certainly the two calves had n difficulty in reading this Takin's intentions!

In the second stage of the attack, the Tak made provocative feinting motions with her hea hooking to the right with what would one d be formidable horns, but which now were luc crously incapable of inflicting any injury. O of the calves had the gumption to respond to th ultimate affront, and the two sparred briefly he to head before the calf backed off. But thou this was repeated several times, the cattle nev really entered into the spirit of the thing, a finally became almost frenzied in their efforts escape. With the Takin between, I became afra that the tethering ropes would cause some inju

ut she stood there completely unperturbed as ough nothing could knock her off her sturdy gs, only occasionally stepping over a rope that ressed too strongly. Even so, I enlisted help to reak it up.

As if to show it was all in fun, after all, the akin now submitted with evident pleasure to aving its forehead and chin scratched. Run-ing my hands through its woolly fur, I noted ie powerful development even at this age of the eck, shoulders and legs. I noted also a definite ut not unpleasant odor of musk, another point common with the Musk-ox that I had not reviously known.

By this time it was dark, and time for dinner. fterwards, neighbors began collecting in the eadman's large (four-room, four-fireplace) ouse, until it seemed the whole adult popula-on of perhaps twenty-five to thirty people was ongregated around the open fires in the two ain rooms.

With our guide translating from Nung to achin, Milton, an old Burma hand and excep-ionally multilingual, got the story of the Takin's apture and taming from the four Nung hunters ho had caught it last July. It was taken nine ays' walk to the north, in those same lofty moun-ains, now snow-blanketed, that the lucky airline assenger may see as he lands at Putao. It was hen no more than two months old, and the

Measured by Mr. Milton, the Takin was 27 inches high at the shoulder, 48 inches long. It weighed 90 to 100 pounds.

Photo by R. D. Estes

The horns are just beginning to emerge and are only about an inch and a half long. They never become really large.

Photo by R. D. Estes

huntsmen had taken turns carryng it on their shoulders all the way home.

Apparently it never occurred to any of the villagers to use a cow as a foster-mother; yet, amazingly enough, though it never again tasted milk, the foundling had been able to begin grazing at this unnaturally tender age, and to grow into the healthy specimen we had just examined. Taking this as an indication of its hardiness, there would seem to be no reason why it should not thrive at the Bronx Zoo, which is certainly no hotter in summer than Sankawng, where it had adjusted very well.

However, when we learned that it was not confined even at night, both of us registered concern for its safety, as Leopards and Tigers roam in the nearby forest. (Indeed, that same night some prowling animal came near enough to set all the dogs barking, and brought the villagers out with torches and loud cries to scare it off.) But after being assured that the Takin took shelter under one or another of the houses during the hours of darkness, and that care would be taken to see it was always in a safe place, we decided to leave well enough alone, rather than risk having it confined to a pen.

The reward the villagers of Sankawng received for taking a valuable animal alive and rearing it successfully should be a powerful incentive to hunters all over Burma to follow the same practice. The money to be gained from the sale of a rare species to zoos in Europe and America will buy far more food than the animals themselves can yield. A number of much-sought-after species are to be found in Burma, including the Musk Deer, the Serow, the Clouded Leopard, Gaur and Banting as well as the Takin. At the same time, indiscriminate capture of animals, especially if, like the Rhinoceroses, they are extremely rare, should not be encouraged, and areas should be set aside for their complete protection. One of the chief functions of the Burma Wildlife Survey will be to recommend such areas.

In the case of the Takin, there is yet another compelling reason why it should be spared and encouraged to increase, to reverse the continuing trend, which is to kill it simply for the sake of meat, under the mistaken assumption that the supply is inexhaustible. The desire for meat seems always to have outweighed any fear of breaking the existing game laws, which forbi the killing of Takin, but the fact is that th Takin, while it may be locally plentiful in som places, has a comparatively restricted range in th higher mountains of southeastern Tibet, norther Burma and western China, and could well b brought to the verge of extinction within few years if steps are not taken to preserve it The most convincing reason for preserving it i economic, for aside from the demand from zoo logical gardens, it has a high potential value a a source of meat, milk, wool and hide. Its neares relation, the Musk-ox, is said to be suited t domestication. The meat is excellent at any ag (so is the Takin's), its milk equals the domesti cow's in quality, and the wool is likewise valu able. Although its coat is not so long and woolly further investigation of the Takin may well sho it to be equally suited to domestication.

Dawn of the following morning found Milto and me packed and just sitting down to a hig breakfast, prepared at that inconvenient hour b our most accommodating hosts. But it was si thirty before we got underway, which meant tha we would have to maintain the same pace as th day before if we were to reach the airstrip b 9:30 when the plane was due to land, to only re main minutes before returning to Myitkyina Again, except for the assistance of the Assistan Resident's jeep, we might not have made it b the appointed hour. However, as it turned ou there was no need to rush at all, for the plan was delayed three hours on the Myitkyina fiel as a result of an electrical fire in the starboard en gine. Had there been any way of knowing b forehand, we could have waited in Sankawn until after the sun burned through the mornin mist, and gotten really good pictures of the Takin

But the wait at the airstrip was not without i reward, for just as the plane appeared out of th south, the curtain of mist and cloud rose to revea the glistening snow peaks curving in an arc b hind the forested mountains in the foreground This was the only view granted us of the Takin home range. But in the near future we hope t return to these remote mountains, there to ob serve the life of the Takin in its natural su roundings, and to seek out a suitably grand an beautiful location for a sanctuary where this odd intriguing animal may be preserved for all time

Orphanage for Australian Animals

By ROSEMARY FLEAY

Lunchtime for William the Wombat at 3 months. He became the inseparable friend of Wanda, another baby Wombat, but tried to crawl into her tiny pouch, as if she were his mother.

Photos by David Fleay

WHEN WE FIRST arrived at West Burleigh in Queensland and started the Fauna Reserve in its wonderful setting of glorious bush, with breathtaking views of river, mountains and sea, I had no idea of the work that lay ahead of me. I had reared several young orphaned marsupials before and was well aware of the demands they made on my time, but here I was to care for two young kangaroos, a baby Wombat and perhaps several young birds with open mouths constantly squawking for food, as well as my other work. At one point I took an outside job in an office but found that before long I was cycling to work each morning carrying a box containing two baby wallabys and their milk bottles, biscuits, warm cloths and hot water bottles. I gave up the job, not being able to give it my full time – and of course missing my other animal charges at the Reserve too much.

Every year finds several orphaned kangaroos, whose mothers have been shot, or killed on the roads, sent to us at the Reserve. It is not an uncommon sight to see someone coming through the gates carrying a pathetic little bundle of rags, from which can be seen a pinched little face with liquid brown eyes wistfully peeping at the strange outside world into which it has been thrust from

Five months old now, this littl Rat Kangaroo drummed th ground with his hind feet as warning to intruders, and the attacked by wrapping his fron feet about one's legs and nip ping sharply. He sleeps all da

the warm security of mother's pouch. We have always done our best for them, but very often nothing could be done when they had been fed on undiluted cow's milk or perhaps had been handled overmuch by people who were trying to help them, probably feeling a bit guilty about the slaughter of the mother kangaroo. If the joeys had a covering of fur there was always a good chance of their survival, but with all young marsupials one could never forecast their future prospects with certainty. The slightest stomach upset, change of daily routine or a sudden rise or drop in the temperature, causes a chill in most cases. Then all the drugs and constant attention one can give are practically useless.

We have successfully reared quite a few of these soft-furred, brown-eyed, gangling youngsters and have of course become very fond of them. Many a time I would hear a thump on my bedroom floor during the night, then thump, thump, thump, accompanied by a squishing cough as an orphan kangaroo tumbled out of its warm bed and hopped about, calling and searching for secure cosiness once again. The only thing to do was to get up and prepare a nice warm bottle of milk for the tiny mite, bed it down once again and try to snatch a few more winks of sleep before rising and filling many more hungry mouths on a new day.

A Great Gray Kangaroo youngster came to us from the southern coastal region of Queensland. We named him Sandy MacNab and before long he became my constant companion, following me about and making soft clucking noises in his mouth to express approval of his meals. All to soon the time came for him to be put into th large kangaroo enclosure with the adult kang roos, where visitors could mix with them and p the animals as long as they did not try to tea them. However, several people have violated th rule with unpleasant results. One day we hea a terrific commotion and raced to the scene find that Sandy had taken a violent dislike to man who had obviously been teasing him. Sand rearing back on his tail and wrapping his hai arms about the man, was ripping downwar with his powerful hind feet. The man's shi was already torn and he was very glad to be free from the kangaroo's clutches. As a result of h rough tactics, Sandy MacNab now resides wit other "outlaw kangaroos" in an enclosure wit the Emu flock.

George, a fat and cheeky little Rat Kangaro came to us in a box containing a hot water bottl a bottle of milk and a juicy golden pineapple f our own consumption. A kind pineapple grow sent him to us after coming across the dea mother Rat Kangaroo with the terrified George her pouch. He thrived on a diet of swe potatoes, mash, and of course a daily dish of mil He snoozed away the daylight hours in a se dug hole, lined with grass which he carefully c lected and carried rolled up in his short, thi tail. If anyone dared enter his enclosure durin his moonlight meanderings, he would approac drumming first one tiny hind foot then the oth on the ground, with footwork which would credit to any prizefighter. After this warning

would attack, wrapping his front feet around one's legs and nipping sharply.

A young Silver-Gray Possum joined the nursery and did several Houdini escape acts from his box in my bedroom. One morning he disappeared and could not be found anywhere. After searching unsuccessfully most of the day I was feeling very sad at the thought of the helpless mite wandering aimlessly in the bush and perhaps falling victim to a hungry fox. I went to a wardrobe to don a coat before starting a night search, and upon putting my hand in my pocket came in contact with a snug but very hungry little possum. He seemed very pleased with himself at finding a ready-made pouch. He was liberated when grown but many of our pet possums have refused to leave the house after being set free. One complete family lived in the roof of our home, making nightly excursions to raid the fruit in the store shed. Two great pets, Timmy and Nosey, were liberated half a mile away and my brother awoke one night to find they had returned to the house and taken up residence in his bedroom. Yet another possum found its way into my father's room and he awoke early one morning to find himself staring into the brown, beady eyes of a baby possum which was sitting on his pillow, quite happily cleaning its whiskers.

Perhaps my most entertaining "foster child" was Dizzy the Dollar Bird, who was found on a hot bitumen road when a fledgling, and rescued by a kind motorist. Dizzy had barely a feather and was a pitiful sight but he soon regained his strength and like all young birds continually clamored for food. Juicy grasshoppers and beetles made him yell all the more and his "machine gun" voice seemed to wind up into a crescendo at the sight of them. As he grew, his drab gray feathers changed to a distinctive blue-green with silver dollar spots under each wing, which give the name of Dollar Bird. When he was old enough we liberated him, thinking that he would join his own kind and migrate north with them on their annual search for the sun. But not Dizzy. He found himself a favorite perch on the roof and whenever I ventured outside the door I was

gest of the animal friendships that developed g the Fleays' animals was that between a Emu chick and a tiny Red-necked Wallaby.

greeted by his staccato voice, which became louder and more joyful as he arrived in a flurry of feathers on my head or shoulders. I missed his cheery welcome one morning and although we searched the place, no trace of him could be found. We were all very sad, for Dizzy had afforded us many laughs with his vociferous welcomes and his many narrow escapes when he accidentally landed in other birds' enclosures. Many a time his irate voice, scolding loudly, would bring us to the rescue to find him being held aloft in a larger bird's beak. However, the last few Dollar Birds flew north in the week of Dizzy's disappearance, and we could only hope that he had winged on the journey with them.

Wanda and William, the Wombat babies of two years ago, were inseparable when tiny and were a comical pair, always getting into mischief together. It was a common occurrence to find them climbing the front stairs and searching for discarded chewing gum, for they delighted in getting themselves as sticky as possible. I always had the utmost difficulty in keeping them away from the deep rain-gutter, which held a fascination for them. They once escaped me and were found clinging on for dear life to the edge of the gutter and "squishing" loudly for help. Wanda was much larger and several months older than William, and he was always making hopeless attempts to crawl into her undeveloped pouch, as if he were sure she was his mother. Finally they quarreled, and Wanda, having advantage in weight, trounced William. Now they are separated and they snarl at each other with loud, wombat cussing noises when attempts are made to reintroduce them. For the time being, anyway, it is the end of a beautiful friendship.

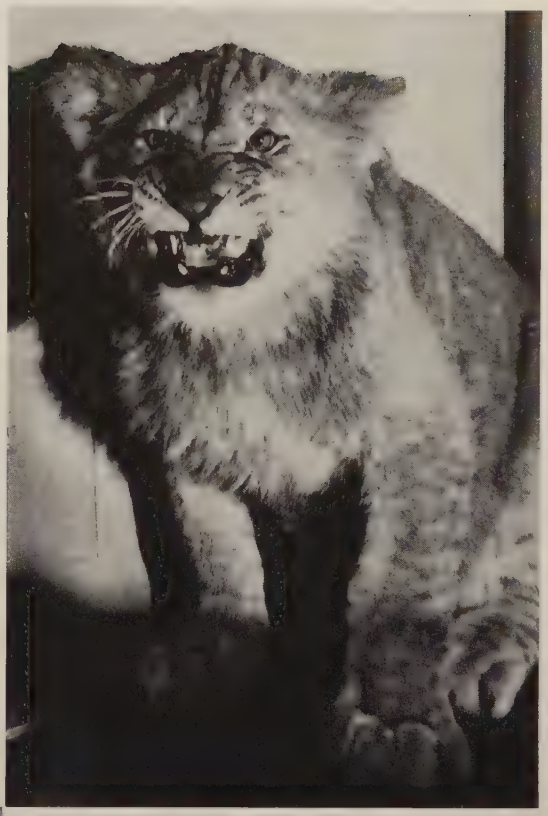
Irene was a Black-backed Magpie that joined the family and created many disturbances. She had the freedom of the Fauna Reserve and strutted about keeping a keen eye on everything that was going on. If any boisterous children tried to pick her up, she would suddenly drive her sharp beak into a hand or leg and strut away in a very dignified manner, clucking to herself indignantly. If a cage was being cleaned, or an animal fed, or perhaps the Platypus show was in progress, Irene made a point of attending. Arriving at the scene, she would throw her head back and deliver a magnificent crow which would do justice to any rooster. Once when feeding the baby Wombats on the lawn I was dismayed to find that Irene had stolen and swallowed the rubber top of their feed bottle, mistaking it for a juicy worm. It didn't harm Irene, but it took a week or so before the Wombat babies would feed properly from a new bottle top. At dusk every evening Irene would arrive like a rocket through the kitchen window and perch on the curtain pole. From there she would watch everything, seeming to like our company. When I stirring march or perhaps her favorite Spanish Flamenco music was playing on the radio, Irene would put her head back and "swing" in time to the music, ending up with a happy little crow. She would continue this concert until sleep overcame her and she tucked her head under neath one wing and dozed off.

In the morning Irene would open her eyes fluff up her feathers and after preening herself would, if not watched, make a tour of inspection of the breakfast table. One morning she sampled the butter and jam, then walked through father's plate of porridge before being caught and put outside. It was a sad day when Irene disappeared and after looking and listening for her cheery warbling we finally gave up hope of finding her. A fortnight passed and during breakfast one morning we heard a familiar crowing noise outside the front door and opened it to find a very bedraggled Irene on the doorstep. She was thin and had had her wings clipped by whoever had caught her, so she must have walked back home. We were overjoyed to find her, for although she was an awful nuisance we were all very fond of her and regarded her as almost one of the family.

Some young animals and birds formed strange partnerships when reared together. An interesting association which still exists was that of our rare white Emu chick, Snow White, and a tiny Red-necked Wallaby, Jennie. They grew up together and found great comfort in each other's company. Whenever they became separated the Emu ran up and down, frantically uttering shrill piping notes. Jennie fretted too. Each evening they bedded down together, the wallaby with her feet underneath Snow White's feathers and her tiny forepaws dangling over the Emu's neck. Although the Emu is now almost fully grown — as Jennie is, too — they are still great pals.

ZOO NEWS IN PICTURES

Photographs on this page
by Henry M. Lester; others
by Staff Photographer Dunton



LIONS are a good deal like people. Some are naturally even-tempered and some are stand-offish and irascible. These two photographs are good illustrations of two varying temperaments among the five cubs we acquired in January as eventual replacements for the elderly Lions now living on Lion Island. One of them, while not tame and gentle to the point that it voluntarily offers to play with its keeper, nevertheless regards him with interest, is not afraid and has a "sweet" expression. As for the cub pictured at the top – well, if it didn't snarl constantly, its keeper would think it must be sick! These studies were made in the Animal Nursery by Photographic Consultant Henry M. Lester while testing a new "zoom" type of lens for 35 mm. still cameras.

This is the first specimen of **PALLAS'S CAT** we have ever had – and it is a beauty! As well as rare. It comes from the Siberian steppes, the Mongolian deserts and the highlands of Tibet, is supposed to feed for the most part on small rodents, and at one time (but no longer) was supposed to be the remote ancestor of the domesticated Angora or Persian breed of cats. With its long, soft, fluffy, tan-and-grizzle hair and heavily-furred tail, it looks as if it might be – if some of the temperament were bred out of it. A hiss, a growl and a hard, explosive spitting sound, accompanied by a short dart toward an intruder, are characteristic. While the cat was still in the Animal Hospital, waiting until a place could be found for it in the Small Mammal House, it invariably reacted to its infrequent visitors by a darting rush forward, a loud "thutt!" and a rumbling growl. These are apparently merely manifestations of its uneasiness at the new and strange surroundings, and they are wearing off. Indeed, although it pretended to spring at Keeper Waltz when he opened the compartment door, he could stroke it gently with a gloved hand and it made no attempt to bite or scratch. Probably it will become completely at home in a short time. Eventually we hope to obtain a mate for it. One is now on order.

This ungainly creature, now on exhibition in the Reptile House, is the **LARGE-HEADED RIVER TURTLE**, *Batrachemys nasuta*, from northern and middle South America, and is the first one we have ever exhibited. It is a rare member of the side-neck turtle group and is believed to be an adult, with a shell about 10 inches long. There was some difficulty about feeding it at first, but eventually it began to eat clams, and now takes fish readily. Most side-neck turtles seldom come out of the water, but this one occasionally does.

Thanks to Kipling and his Rikki-Tikki-Tavi, the Indian Mongoose is an animal that almost everybody knows by name – but which few Americans, at least, know by sight, for its importation into this country is forbidden by law. However, the **AFRICAN MONGOOSE**, or **ICHNEUMON**, is not prescribed and we have recently received our first specimen of this interesting animal through the courtesy of the National Zoological Park in Washington. *Herpestes ichneumon* is considerably larger and darker than the Indian Mongoose, *Herpestes auropunctatus*. Our animal is not entirely tame, but it is quiet and steady and is apparently thriving in its new home in the Small Mammal House. Its native home is non-desert Africa, ranging into Spain, although it does not seem to be common anywhere. In the wild it eats small mammals, birds and reptiles, but is doing well in the Zoo on meat and eggs.

Wildlife Challenges in East Africa

By NOEL SIMON

Chairman, Kenya Wild Life Society

The article that follows is the text of an address given by Noel Simon at the North American Wildlife Conference in New York in March. It was prepared by Mr. Simon and George Treichel, the Wildlife Research Associate of the Zoological Society and The Conservation Foundation, and is published here because it states clearly and succinctly what the problems are that now face the friends of African wild life, and suggests what can and must be done.

British East Africa, an area one-fifth the size of the United States and comprising Uganda, Tanganyika, Kenya and Zanzibar, is generally regarded as a part of the world populated with vast numbers of spectacular wild animals. Fifty years ago this was quite true and in 1907 the railway running from the Indian Ocean deep into the interior of Uganda advertised that its "observation cars pass through the greatest natural game reserve in the entire world." But in more recent times, particularly since the end of the last war, the great pace of development coupled with an astonishing numerical increase in the African population have altered the natural environment until today only a few restricted localities support significant stocks of large mammals. Not only are the remaining wildlife habitats being progressively reduced in size, but at the same time relentless human pressure on the fast-diminishing remaining herds – in the form of large scale poaching – is having disastrous consequences.

To illustrate the significance of the current illicit slaughter of wildlife, it is necessary to explain that in the great Serengeti National Park in northwestern Tanganyika, which is generally regarded as the outstanding sanctuary on the entire African continent, a 1958 census has revealed less than 400,000 large animals of all species; this is an area where it has been fashionable to speak of millions of animals. It is important to note that this is the *only* wildlife concentration of its kind remaining on the entire African continent today, for there is no other place where even 100,000 head can be noted; yet 25 years ago there were several. To see this in its correct perspective, it is necessary to add that this figure is considerably less than the annual harvest of whitetail deer in the United States. Furthermore, the Director of the Tanganyika National Parks estimated that not less than 150,000 wild animals were killed by African poachers in and around the Serengeti National Park in each of the last few years.

The recent major anti-poaching operation in eastern Kenya disclosed the extent of poaching of elephants in the Tsavo National Park and adjoining Coast Province. In one relatively small area no less than 1,280 elephant carcasses were discovered, and it was estimated that approximately 3,000 elephants have been destroyed by poison arrows in this region during the past three years. The peak seasonal elephant population in the Tsavo Park is estimated to be about 4,000, so it is very apparent that if poaching is allowed to persist at this rate, there can only be one outcome.

Several other species have had serious population reductions and are in jeopardy. Dr. Fraser Darling and Dr. Bernhard Grzimek each inde

Snow-covered Mount Kilimanjaro looks down the plains of Africa, where the great aggreg tions of wild animals are fast disappearing. T striking scene is in the Nairobi National Pa

Photo by Ylla, from "Animals in Africa"

pendently stated that they would be surprised if more than 1,000 black rhinos remain in Kenya today, yet only ten years ago a member of the Game Department was employed to shoot over 900 rhinos in the Makueni area alone, to make way for an African agricultural settlement scheme. In the Mara region, the finest lion country remaining in Kenya, there are not more than 250 lions today. This is the situation in a part of the world which many think is still overrun with wildlife.

The only hope for the future of wild fauna in East Africa lies in a two-fold program. First, the acquisition of basic factual data — at present noticeably lacking — on which proper long-term management programs can be based. Second, but equally important, measures must be taken to win the African over to the realization of the value of wildlife conservation.

The solution on which all else ultimately depends concerns the attitude of the African himself. For unless we make the effort in the years immediately ahead to alter the present attitude of the Africans, there can be no hope. The attitude of the more advanced African was adequately summarized by an African politician who stated that the presence of wild animals merely served to remind him of his own primitive past which he earnestly wished to forget. Therefore, to eliminate this primitive past, it would *ipso facto* be necessary to destroy the animals with which that past was associated. The less sophisticated African has an insatiable craving for meat which can only be appreciated by those who have witnessed it. A combination of a rapidly expanding African population endeavoring to satisfy this craving for meat on a rapidly diminishing number of wild animals can have only one result.

If any effective long-term preservation plans are to be taken it seems logical to suppose that the African must first be converted from his present attitude of mind and convinced of the value and worth of the fauna around him. This is nowhere near as simple as it sounds, but unless it is done there is little hope for the continued survival of wild animals outside the few national parks and sanctuaries. It is fundamentally impossible to put an end to the unnecessary and wasteful slaughter of animals without the active cooperation of the African himself.

It has been suggested that this could best be achieved by education, particularly in the schools through the medium of films, publications and lectures. This suggestion is admirable insofar as it goes but even the most ardent protagonist of this approach to the problem must concede that it will be a very long time before such methods produce worthwhile results, and by that time there may be precious few animals left to conserve. After all, it is expecting a great deal to completely alter the inborn belief of countless generations of Africans that the only useful wild animal is the one in his cooking pot. By all means let every possible method of converting the African by education be explored, but let it also be recognized that this is a long-term policy. How can an African conceivably become pro-game when he derives no benefit from its protection? How can he be expected to understand or appreciate aesthetic considerations or even that the preservation of wildlife is of great material benefit to the country as a whole? Many Africans, particularly the pastoralists, consider that they are expected to preserve wild animals on their own land for the benefit of a few wealthy Europeans and that they themselves derive no benefit whatever from the arrangement. This naturally causes resentment. There is only one argument to which an African can *at present* be expected to respond and that is the simple expedient of seeing for himself that he personally derives material benefit through the preservation of wild animals.

In East Africa it is unlikely that wild animals will be allowed to survive for any length of time purely for aesthetic reasons and unless it can be shown that these wild creatures can contribute directly or indirectly to the economy, they will eventually be compelled to give way to more profitable enterprises and the inevitable needs of human expansion. In order to insure the survival of the greatest possible number of wild animals, it is necessary to remember their right to live will be judged largely in relation to their economic status. In the case of national parks, this condition is already fulfilled in that these parks bring in considerable revenue from the tourist trade. But the present system of national

parks does not adequately conserve sufficient examples of East Africa's varied habitat and wildlife, and it is for this reason that game management zones must be created. In this connection, it is necessary to emphasize that this concept is based on the belief that certain areas of East Africa would yield a more profitable return to the country as a whole under wild fauna than under domestic livestock. This precept is undeniable, although it may not be easy to convince Government of its wisdom because of political and other considerations. The question is basically one of proper land utilization.

Ideally, each national park should be surrounded by a game management area (although this will not always be possible to achieve), the latter acting as a form of protective outer barrier for the central kernel of the Park proper. In these game management zones it will be necessary to adjust our thinking and accept the fact that there is nothing morally wrong in harvesting an annual crop of wild animals, in precisely the same way as a farmer has no compunction in marketing his excess cattle or sheep every year. This idea is well known to American wildlife experts, but it is a new idea in Africa. At the same time, poaching might well be reduced to smaller proportions than is the case today. Furthermore, the African would be ensured of his meat requirements.

The only solution for maintaining significant stocks of wild animals outside of the protected limits of the national parks lies in some form of partnership with the African, aimed at securing his cooperation through participation. He must be enabled to see for himself the direct benefits accruing from a sound wildlife conservation program. With this in mind, the Kenya Wild Life Society has proposed setting up a pilot game management project for the benefit of the Waliangulu tribe in eastern Kenya. This project is based on harvesting an annual surplus of wild animals on a sustained yield basis. It is, in fact, a protein-production project designed for regions entirely unsuited for domestic livestock or agriculture in the normally accepted sense, with all proceeds going to the African participants. Along these lines lies the future of Africa's unique wildlife heritage outside of the national parks.

The Waliangulu are a small tribe living in Kenya's coastal hinterland whose traditional way of life has been the hunting of wild animals. Until very recently they hunted only for the pot and their own immediate needs, but have now taken to hunting on a large commercial scale, dispensing the ivory and rhino horn through a well organized ring of Asian receivers and leaving the carcasses of their victims to the hyaenas and vultures. As a result the Waliangulu are virtually poaching themselves out of existence by destroying their own means of livelihood. The Waliangulu poachers receive a mere pittance for ivory and rhino horn on the black market. As the average weight of ivory is 20 pounds per tusk recovered, the poacher receives something in the neighborhood of $25 per elephant, whereas an elephant if properly utilized is worth at least $300. If steps can be taken to legalize and *control* (on a cropping basis) the slaughter of elephants, the Waliangulu will be able to receive the full market value of the elephants and will, therefore, receive a far larger financial return for killing considerably fewer animals. By this means their traditional way of life will be maintained, stocks of wildlife safeguarded for the future through proper management and the black market run out of business.

There is a definite possibility in this area of utilizing existing wild animals as a form of continuing protein production for the benefit of the native inhabitants. In certain under-developed areas, chiefly arid and some tsetse regions, the harvesting of wildlife would be a far more satisfactory method of obtaining protein than would result from the farming of domestic stock. It would also be a wiser form of land use. In Africa, international development organizations have made considerable sums of money available for building up fisheries as a source of protein, but little if any thought appears to have been given to the possibility of utilizing wild animals as a productive source of protein for the benefit of the native inhabitants in areas notably deficient in protein.

The time factor is most important; every possible step should be taken to commence this Pilot Project with the least possible delay. If successful, there is no reason why similar projects should not be undertaken elsewhere for the benefit of other tribes. By this means a number of areas at present useless from the point of view of normal

husbandry and merely serving as poachers' playgrounds could become highly productive, benefiting not only the tribesmen themselves but the country as a whole. At the same time, although almost incidentally, fresh zones would be created in which large numbers of wild animals would be enabled to survive for the benefit and enjoyment of future generations.

It would, of course, be out of the question to think in terms of instituting game management programs in heavily populated native reserves. Game management zones are suggested only for those arid, semi-desert tracts which are never likely to be capable of supporting more than an extremely limited number of people and then only at bare subsistence level; in these zones any form of economic animal husbandry in the accepted sense would be out of the question. Anyone who has seen this poor, waterless portion o the country will realize that its wisest use woul likely be in some system of game management Wild animals have lived there for countless gen erations without damaging the vegetation an soil. Certain tsetse fly regions would also b eminently suitable for game management proj ects. It seems strange to think that substantia sums of money are being spent in eliminatin species of wild animals eminently adapted t some of the tsetse fly areas in Africa and attempt ing to replace them with domestic animals whic are entirely unsuitable, and which are unlikel to yield as big a return in terms of protein.

It has become apparent that if East Africa i to succeed in preserving its fauna, it is going t need the help of a small but permanent team o biologists who will increase the strictly limite

nowledge of animal habits and requirements. This permanent research team might be started y obtaining the services of qualified United States, Canadian and British ecologists for spe- ific projects. Here is an entirely new oppor- unity for field research of a kind never seriously ttempted before in Africa *on a permanent basis.* Vithout the factual knowledge that trained biol- gists can provide, East African countries stand n grave danger of making faulty decisions and dopting wrong policies. In particular, the serv- ces of expert grassland and wildlife ecologists vho will help increase knowledge of *range man- gement* are needed.

East Africa possesses research organizations for nost of its essential resources – agriculture, for- stry, fisheries, and so on – but a similar organi- zation for wildlife is noticeably lacking. This is because the conception of managing wildlife as a natural resource is a very new idea in this part of the world. It is a strange paradox that East Africa, which possesses the greatest and most varied wildlife resource to be found in the world, should possess so little essential knowledge of the requirements and needs of that resource. Undue emphasis is placed on controlling the kill, and

ing for ivory — which often means that the is not used at all — is widespread and a real to the existence of the African Elephant. This was seized by the Belgian Congo government.

not enough on understanding and managing the range and wildlife populations. Long-term wild- life range management programs have not yet been initiated in Kenya, Uganda or Tanganyika. In some European countries, and particularly in the United States and Canada, wildlife manage- ment problems which East Africa is only just beginning to comprehend have been tackled vig- orously for many years. Some of these solutions could, with necessary modification, be applied to parts of Africa. Our greatest – and one might add desperate – need is to establish facilities for a permanent faunal research organization in East Africa. The valuable investigations recently undertaken by Drs. Petrides, Swank, Buechner and Longhurst of the United States, Dr. Darling of the United Kingdom and Dr. Grzimek of Germany, must be continued.

Unfortunately, there is insufficient local government money available to invest in a permanent wildlife research organization, for with very limited budgets, top priority in expenditure is invariably given to projects having more immediate benefit to the African inhabitants – schools, hospitals and agricultural programs. There is relatively little available for national park developments and the proposed wildlife management programs; for example, the total Kenya budget covering *all* government services last year was less than the funds allocated in the United States for the National Park Service alone. The United States is the only country in the world with the will and the means to provide assistance and technically trained men to begin a permanent wildlife research organization. This does not mean that East Africans intend to relieve Government of any of its financial obligations, but rather that they should tempt Government to provide for these additional new services on a matching basis. The United States not only pioneered the national park movement but in more recent times has been instrumental in formulating and developing the concept of maintaining wild land as a recognized and legitimate resource. East Africa could profitably import some of the techniques so successfully developed in North America.

In summary, the present wildlife situation in British East Africa is critical and unless adequate measures are taken as a matter of urgency, another decade or two may well see the total elimination of wildlife in this part of the world except for scattered remnants in a few isolated token regions. In many parts of Africa the effort to conserve wildlife has come too late. In ten years' time it may be too late for East Africa. Wildlife management on a scientific basis is required as a matter of urgency. Technical and financial assistance are needed, for time is quickly running out on the most spectacular remnants of the world's wildlife. This state of affairs represents what may justifiably be regarded as the greatest challenge in the field of wildlife conservation since the near-elimination of North American bison herds late in the last century. The next five years are vital because unless sound policies and practices can be determined and applied within that period, we shall have missed the opportunity which, if lost, will never be repeated.

What Birds' Nests Tell us

By EDWARD A. ARMSTRONG

Author of Bird Display, Birds of the Grey Wind, etc.

WRITERS OF POPULAR BOOKS about birds at the end of the last century tended to regard them as incomplete unless they introduced a disquisition on birds' nests with, perhaps, a little moralizing about the ingenuity of these "feathered craftsmen." Nowadays when almost every aspect of bird life is discussed in books and scientific papers there is very little written about nests. Yet they are of great interest. Apart from other considerations, the very existence of a species depends ultimately on its placing its eggs in a sufficiently safe site. Birds are most vulnerable at nesting time. Inefficiency then spells extinction.

Birds are much more adaptable in choosing sites for their nests than in changing the form of the nest to suit altered conditions. The Duck Hawk which usually nests on a cliff ledge may choose the roof of a skyscraper in a Canadian city or bare ground on Siberian tundra. The Red-winged Blackbird normally breeds in swamps but on small islands may nest in trees or even in holes. Every field naturalist can recall finding nests in odd situations. Adaptability in nest site selection is excellently illustrated by the House Martin which in Europe has taken to nesting on buildings to such an extent that the discovery of a colony on a cliff, the ancestral nesting site, would deserve recording in an ornithological journal.

On the other hand, there are strict limits within which the form of a nest varies and exceptional divergences from the standard pattern are rare. Even then they can usually be accounted for by interference of some kind with the normal procedure, such as the illness of the bird or the unsuitability of the nesting site. More than a century ago the Scottish poet James Montgomery wrote:

> All the wing'd habitants of Paradise,
> Whose songs once mingled with the songs of angels,
> Wove their first nests as curiously and well
> As the wood minstrels in our evil day,
> After the labours of six thousand years,
> In which their ancestors have fail'd to add,
> To alter or diminish anything.

Montgomery died before Darwin published hi views on natural selection, showing that fixity o behavior was apparent rather than real, but if w seek illustrations of prolonged stereotyping of be havior we can hardly find a better example tha that chosen by this old Scottish poet.

The fixity of nest pattern as compared with th modifiability of other aspects of behavior an structure is beautifully illustrated by considerin

Below. — Green Caciques like to nest in larg onies, and here their nests dangle from a tree forest at Rancho Grande, Venezuela. Right.— A cacique, close up, peers from the tiny nest op

Both photos by William Beebe

what happened when a few birds arrived and established themselves on birdless islands far out at sea. The Honeycreepers of Hawaii are descendants of a few storm-driven waifs. In process of time and through the operation of natural selection these birds' descendants have evolved into 22 species which differ in size, songs, feeding habits and particularly in the shapes of their bills, some having long, curved sickle-form beaks, others having bills nearly as stout and short as a Grosbeak's. The nests of all these birds are very similar. Again, in the Galapagos Islands the descendants of the original immigrant finches have become differentiated into a "warbler" type, a "woodpecker" type, and so on. One has even acquired the capacity to use a cactus spine as a

tool to poke insects out of crevices, but there is extremely little difference between the nests. Evolution is relatively rapid in such conditions and the absence of predators reduces the importance of choosing a nest site as nearly inaccessible as possible, but the outstanding fact is that the nest pattern has remained unchanged when almost all other outward characteristics have varied.

The Redwing or Red-winged Thrush of Europe and the American Robin are related. One has evolved chestnut red flanks and the other a red breast but they both build similar types of nest, lined with mud overlaid with dry grass. The Winter Wren of North America and the wrens of Europe and Asia are all of the same species and it is now accepted that the wrens of the Old World are the descendants of the pioneers which crossed Bering Strait. The wren of Iceland is larger than the Winter Wren and has a different pattern of song but apart from the nest being slightly larger it is similar to the nests of American and English birds. When wrens build in nesting boxes they make a roofed nest as they do when they build in a bush.

On the other hand the English Sparrow, which might better be called the House Sparrow, a bird usually choosing cavities for its nest, makes a domed structure when it nests in small trees or bushes. Thus even when the customary nest site changes, alteration in the nest pattern tends to lag behind. The House Sparrow used to be classed with the finches but now it is placed with the weavers. This classification is supported by the roofed type of nest. The weavers are mainly tropical and most of them build covered nests. This bird is sometimes spoken of as "ubiquitous" but, as is well known, its presence in many parts of the world is due to introduction by man. It is not generally realized that in ancient times man was indirectly responsible for extending the sparrow's range. Before agriculture was practiced the bird must have been confined to a relatively small area. In Neolithic times human activities, such as cultivating grain and erecting buildings, provided it with food and shelter. We may assume that as man subdued the forests the sparrow advanced northwards. In Europe it is doing so still. Where railways, roads and dwellings have recently been built north of the Arctic Circle it has followed.

When House Sparrows build in bushes the nests are rather untidy. This suggests that through long adaptation to crevice-nesting the species has lost much of its competence in weaving materials. The House Wren, one of the few species of wren to build in cavities, merely packs twigs and other materials into the hole. We may presume that its adaptation to cavity nesting is more ancient than the House Sparrow's and has proceeded further. Although birds show great tenacity in retaining a type of nest it seems that they can lose ability to build more rapidly than

The Red-winged Thrush and the American Robin are related and they both build rather similar nests, mud-lined and overlaid with grass. This is the Red-wing's nest and young.

Photo by the author

they can acquire it. Too, birds of prey differ greatly in size, coloration, feeding and other adaptations but practically all build the same type of open nest except those species which hardly make any nest but choose cavities, ledges, flat ground or the deserted nests of other birds.

The wren's ancestry, like that of the House Sparrow, is, as we shall see, tropical. Is it coincidence that these two birds should both build domed nests? On the contrary, such nests are relatively common in the tropics. There are two outstanding types of covered nest — the globular or ovoid and the pendent bag types, both usually having the entrance at the side or near the bottom. There is a third typical form — the hammock type — a long pocket suspended from twigs with the entrance at or near the top. Compared with the other types it does not shelter the contents so completely but has the advantage that the brooding bird cannot readily be trapped in the nest.

It would seem that clues provided by the form of nests, if used with discretion, can provide useful evidence of the ancestry of birds and the areas in which groups evolved. According to the extent to which supplementary evidence is available, greater or lesser degrees of probability can be attained. The range of the wren *Troglodytes troglodytes* extends throughout most of the temperate regions of North America, Europe and Asia but its relatives are most abundant in the New World tropics. The nests of most of them, whether they nest in deserts, like the Cactus Wren, or in swamps, like the Marsh Wrens, are globular or ovoid. Far removed geographically from the Americas as the wrens of the Altai Mountains may be, their structure, behavior and the type of nest they build all indicate that their ancestry must be traced to the warm areas of the New World. We cannot be so certain concerning the ancestry of the dippers which also range over mountainous areas of temperate Europe and Asia but in North America are found in regions in the west, though they extend southwards to northwestern Argentina. Some experts have considered them as related to the thrushes and their classification is still a matter of discussion. But if we put together all the evidence, suggesting an affinity with the wrens, including the globular nest form, similarities in form and display as well as distribution, it would seem most likely that they spread from the New World to the Old.

Kennicott's Warbler, which breeds in Alaska, is a subspecies of the bird known in Europe as the Arctic Warbler. Like the birds which nest in Europe and Asia it winters in tropical eastern Asia. In spring the Old World Arctic Warblers set out on an astounding journey from their win-

er quarters in the Philippines, Indo-China, Indo-nesia and Malaya. Going through China they cross the continent of Asia, some of them reaching northern Norway. This species is one of the leaf warblers and, like its relatives, builds a domed nest on the ground. Although it nests beyond the Arctic Circle and related species breed in temperate Asia and Europe, its adherence to wintering in southeastern Asia, together with other indications that the leaf warblers originated there, suggest that it, too, is of tropical ancestry. Once again, the domed nest provides an additional clue.

Experts are not agreed as to whether the Long-tailed and Penduline Tit of Europe are related, or, indeed, as to whether they are properly classified with the tits. These two species are the only European birds which build enclosed, felted nests. This, and other similarities of behavior, suggest that those who think the two species unrelated may be mistaken. At all events, it is highly probable that the ancestry of both can be traced to the tropics. There are several African species of Penduline Tit.

The third type of nest with which we are concerned, the hammock-pocket, is constructed by a number of tropical birds, including some hummingbirds. It is the type of nest built by the Baltimore Oriole in the United States and the Golden Oriole in temperate Europe. These birds are placed in different families and thus are not regarded as very closely related. Both families have a large number of tropical representatives and so we may reasonably assume that here we have birds which, one in the New World, the other in the Old, have brought their nest pattern from the south. The problem is more difficult in regard to the other hammock-nesting birds of the northern hemisphere — the kinglets. They are predominantly northern birds, though the Golden-crowned breeds as far south as Guatemala. Yet the form of the nest suggests that it would be worth while to look for other indications that these birds also originated in warm countries. It seems to be much easier for tiny birds to evolve in the tropics than in colder areas. The smallest birds of the world, such as the hummingbirds, are mainly confined to the tropics.

Why should so many birds of the tropics or of tropical origin build nests of one or other of these three types? Even in temperate regions direct sun shining on a brooding bird will reduce it to great distress. This applies even more strongly to the tropics where the sun's rays would quickly kill the embryo in exposed eggs of small birds. However, this cannot be the principal reason why birds build covered nests, for the nest site chosen by the smaller species in the tropics is usually sheltered from direct sunlight. The contrary explanation has more plausibility — that the covered nest conserves heat. If this were its main function one would expect it to have become a common type in higher latitudes but, as we have seen, this is not so. The covered nest appears to be an adaptation to hot climates.

There is an interesting special case. If a male bird has several mates he cannot give regular help at the nest of all of them. The females may have to do all the incubating, tending and guarding of the young unaided. Eggs or chicks are left unbrooded for longer intervals than when the male cooperates. Thus we find that a number of

A cavity nest is constructed by the Willow Tit of Europe. This gives considerable protection, for the opening is so small that only a small predator can enter, and it is inconspicuous.

Photo by the author

polygamous species, such as the wren in favorable habitats, the Penduline Tit, some Indian and African wrens and Wagler's Oropendola of Central America, build covered nests of vegetable material. Others, such as the Pied and Collared Flycatchers of Europe, build in tree cavities.

The main function of the types of nest we have been considering must be to conceal and protect their contents from marauders. In subarctic forests there are only a few arboreal nest-predators such as squirrels and birds of the crow family but in tropical forest there are many, including whole groups, such as monkeys and snakes, which are absent from northern forests and even in northern temperate regions are not serious enemies of tree-nesting birds. In the tropics birds can foil such predators to a considerable extent by hanging their nests at the tips of branches, as is done by several species of weavers and Penduline Tits. I have seen a band of howler monkeys near a group of nests of Wagler's Oropendola at Barro Colorado in the Panama Canal Zone but these agile acrobats, equipped with prehensile tails, could not reach them. The large nests of Oropendolas are very conspicuous as they dangle from the branches but other pendant nests, such as that made by the Tailor Bird of leaves sewn together and of some hummingbirds which hang their hammocks beneath the huge leaves of tropical plants, are very difficult to find. The strong, closely woven nests of Oropendolas and Weaverbirds survive tropical breezes but this type would be unsuitable in northern regions where severe storms may occur during the birds' breeding season.

The globular type of nest provides concealment for the contents, including the brooding bird. Bowl-shaped nests on branches, especially in the tropics, are usually well camouflaged as seen from the side but when viewed from above the eggs, chicks or brooding parent are apt to be much more conspicuous to predatory birds, arboreal mammals or snakes. Moreover, predators seem to find it more difficult to identify a nest as such if only a mass of vegetable material is visible. On leaving their floating nests grebes pull some of the sodden materials over the eggs, and predators never recognize these heaps in the water as nests. When chicks crane up in an open nest to receive food their movements are conspicuous but in a covered nest these activities are concealed. Even when domed nests are on the ground the movements of the parents may be very inconspicuous if the nest is in thick vegetation, as the parents are not outlined against the sky, and birds hopping about close to the ground may appear to be feeding. At least some mammalian and reptilian nest-predators discover nests by noticing movements rather than by spotting the structures.

Thus there is good reason to believe that covered nests are specially useful in foiling predators and that this is their main function in the tropics. Although a covered fabric nest is more vulnerable than a cavity nest in a tree, with an entrance admitting only small creatures, it gives better protection, other things being equal, than an open nest. Covered nests also are often designed in such a way that it is difficult for a predator approaching the entrance to trap the parent bird when escaping. Wrens' nests have overhanging eaves so that the sitting bird can fly out downwards, several tropical species of swallow construct a long tubular entrance, rendering it impossible for a small marauder to creep in unawares, and African Penduline Tits construct bag nests with the real entrance well concealed and a conspicuous false entrance below.

It will be apparent, I hope, from this discussion of the forms of some nests, that the study of birds' nests is not only an interesting hobby but of scientific importance. Many other aspects of the subject are well worth attention: for example, the modifications in the structure of the nest and the birds' behavior when normal nesting materials are not available. The nests of Baltimore Orioles used to contain a quantity of horsehair but now that farms are mechanized the birds use fibres of various kinds — as they must have done before the horse was brought to the New World. The differences in the kinds of material used by closely related species to line the nest are also deserving of attention. Very little is known concerning such matters as whether birds tend to reject vividly colored feathers when lining their nests. Here, in the study of all aspects of the positioning, building, structure and lining of birds' nests, is an aspect of ornithology which should appeal specially to the amateur who likes to spend his leisure in the open and still retain the hunter's delight in finding a bird's nest.

News from the Conservation Foundation

The Human Fertility Problem

The findings of two years of study by Dr. Richard Meier on the implications of fertility control were published in February in a book entitled "Modern Science and the Human Fertility Problem." The book was sponsored by The Foundation.

What is needed throughout the world is a cheap, effective, safe and natural method of controlling fertility, the book asserts, and Dr. Meier believes that science will soon make such a method available.

Alaskan Land Use Study

A contract has been signed between The Conservation Foundation and Hugh A. Johnson and Harold Jorgenson whereby The Foundation will underwrite the costs of an extensive land use survey in Alaska. The study is expected to provide needed background on Alaskan land resources and to help determine the selection of hundreds of thousands of acres for use. Another purpose is to "suggest some direction of thinking about the future management and use of Alaskan resources." A book based on the study will be published early next year.

Filmstrips Get Good Review

The Foundation's series of nine filmstrips in color titled "Demand, Supply and Balance" was released for distribution on March 16 and one of the first reviews comes from *Educational Screen,* a leading magazine in the field. Written by Irene Cypher, film critic of the magazine, it reads: "This is one of the most intriguing sets we have previewed in a long time and one with a host of possibilities to suggest for utilization . . . there should be some lively classroom discussions with the filmstrips; certainly there will not be mere passive viewing, and they offer much in the way of lesson-stimulating power." The Joint Council on Economic Education has already added its endorsement of the strips and a national distributor will be named soon.

Wildlife Conference

This year's North American Wildlife Conference was held in New York City in March and brought together some 2,000 persons concerned with economic, social and ecological aspects of wildlife. Samuel H. Ordway delivered a paper at the opening morning session on "Law and Progress in Conservation," and George Treichel, Dr. Frank Fraser Darling and Noel Simon participated in the sessions on African wildlife. For the first time a panel on pesticides research was included. Roger Hale was chairman of the concluding session at which Laurance Rockefeller delivered a paper on the program of the National Recreation Resources Review Committee, of which he is chairman. Dr. Osborn arranged a number of informal meetings on African wildlife problems.

Briefly Noted

Dr. Osborn addressed the opening banquet of the International Eugenics Conference at the Faculty Club of Columbia University on February 13, emphasizing certain aspects of world population growth. The conference was sponsored by the American Eugenics Society, Inc. . . . Members of the staff of The Conservation Foundation were judges in the Agriculture, Nature and Wildlife classes of the American Film Festival, put on by the Educational Film Library Association April 1-4. . . . Robert G. Snider has returned from the Sixth Bicentennial Planned Parenthood Conference at New Delhi. . . . News from Dick Cooley's very active "Research Center — Alaska Natural Resources" at Juneau indicates that projects are under way on Land and Resources Use, a study of Alaskan salmon and consideration of a study of native use of fish and game. . . . Government and industry officials alike complimented Roger Hale's realistic paper on "Pulpwood, Pesticides and People" delivered at the meeting of the American Pulpwood Association at the Waldorf-Astoria on February 25.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Dr. Myron Gordon 1899-1959

Dr. Myron Gordon, Geneticist of the New York Aquarium since 1947, died suddenly on March 12. He was 59 years old.

Many articles by Dr. Gordon have appeared in the Zoological Society's publications in the past 20 years, often following his return from an expedition to Central America where he had added another link to his chain of evidence concerning the evolution and genetics of the swordtails and platyfishes that were his special interest. His technical papers were less well known to the Society's Members, but among geneticists and ichthyologists – by whom he was considered the outstanding authority – they won for him an international reputation. For several years past his work on melanomas, or black cancers, of fishes was supported in large part by grants from the National Cancer Institute of the U. S. Public Health Service.

Dr. Gordon was a quiet and hard-working scientist who had contributed importantly to our knowledge of melanomas, and from whom a great deal more could have been expected. Science and his friends have lost much.

Flamingos of Four Species in Collection Now

Six species of Flamingos are known and our collection now contains the only four which have ever been exhibited. Now that April is here, they are on daily exhibition in the Flamingo Pool and anyone who remembers their pale colors of last fall before the new diet, containing carrot oil, began to take effect, will be astonished at the brilliance of the species that are highly colored in the wild.

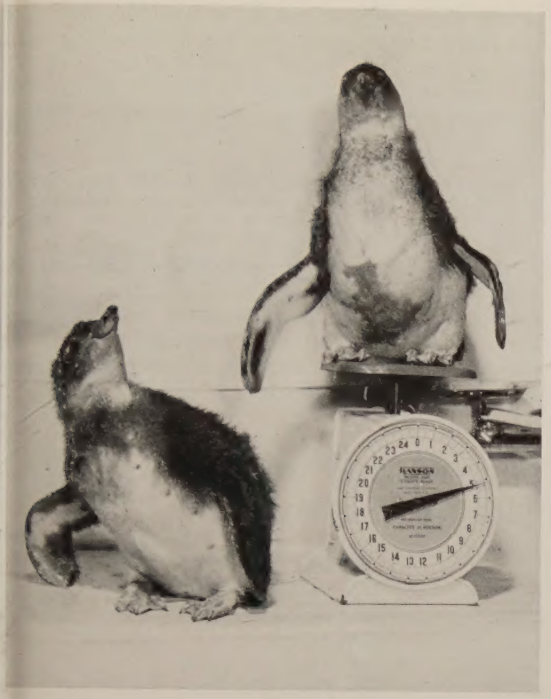
The two Flamingos we do not have are th Andean, *Phoenicoparrus andinus,* and the James' *Phoenicoparrus jamesi,* from the high lakes o the Andes. No zoological park seems to hav kept these two and thus far our own efforts t obtain them have been unsuccessful. The breed ing grounds of James's Flamingo were redi covered in 1957 after a period of half a centur during which they were not observed and the very existence was doubted.

In the collection now are American Flamingo *Phoenicopterus ruber,* ranging from the Bahama through Cuba and Yucatan and northeaster South America with a small population on th Galapagos Islands (we have two young bird from the Galapagos); the Chilean, *Phoenicop terus chilensis,* from South America; the Greate *Phoenicopterus antiquorum,* ranging from southe ern Europe to Africa and India; and the Lesse *Phoenicopterus minor,* which ranges in Africa Madagascar and India. We have 19 American Flamingos and two each of the other species.

Annie, a Celebrated Penguin, Killed by Vandals

Annie, the male Black-footed Penguin whos exploits have been recounted many times i newspapers and magazines, was killed on Fe ruary 9. From the nature of his head injuries, h seems to have been felled by a rock as he guarde his two chicks on the bank of the out-of-doo Penguin Pool.

Annie came to the New York Aquarium i 1935 as an adult bird and was thus somethin more than 24 years old, a good age but not record. Since penguins show no external se differences, Annie was mis-named in the ear days and it was not until many years later whe he had acquired a mate that it was discovere that the supposed female was actually a mal In the early 1940s Annie and his mate nested an



Annie's Last Offspring

for 35 days incubated an egg that turned out to be infertile. When the fact became evident, newspaper articles and editorials expressed the public's disappointment.

After that first setback and the death of his first mate — at which time Annie's true sex was discovered — he mated again and has been the father of most of the 34 chicks hatched in the Penguin Pool.

The last offspring produced by Annie and his equally mis-named mate, Barney, were hatched on December 22-23. Barney showed little interest in them and they are being hand-reared in the Penguin House by Keeper Solanto.

IN BRIEF

Puff Adder Bonus. When we acquired a female Puff Adder from East Africa last year we felt that our Puff Adder needs were satisfied. However, in March the female gave birth to 37 healthy young adders and now we have the problem of finding food for them and homes in other zoological parks for most of them. The father, incidentally, is presumably a young male born in the collection three years ago.

It's Dr. Atz Now. Associate Curator James W. Atz of the Aquarium staff received the Ph.D. degree from New York University in February.

Cheetah Protocol. Cheetahs are, as a rule, easy to get along with — usually inoffensive toward their keepers and willing to make friends among themselves. Such has been the experience of a number of zoological parks, at any rate, but the young female in our collection has different ideas. When she was introduced to a young male two years ago, after a long period of "getting acquainted" through a barred door separating adjoining compartments in the Lion House, further weeks elapsed before she was willing to tolerate his presence in the same compartment. Eventually he died, and now we are going through the same process of cautious introduction. The new male, four years old, is much larger than the female, but she is not intimidated by the sight of him through the bars. She is still in the hissing and spitting stage and it may be several more weeks before the two animals can be left alone in the same compartment.

Garden Party Date. Wednesday, May 27, has been fixed as the date for the annual spring Garden Party at the Zoological Park for members of the Zoological Society and their friends. Detailed announcements will be sent to all Members well in advance.

Spring Openings. The Children's Zoo opened for its nineteenth season on March 28 and the Farm-in-the-Zoo on Saturday, April 4.

A Strange Disease. It has recently been found that the North American Angler, *Lophius americanus,* is subject to a strange disease that attacks the nervous system and causes extensive damage. The agent is a one-celled parasite that lives inside the cells of the cerebellum and other parts of the nervous system. The remarkable thing is that the fish survive and eventually regenerate many of their injured nerve cells — a fact that has caused great interest among neurologists. Drs. Nigrelli and Jakowska at the Aquarium's laboratory have examined more than a hundred of the fish and Dr. Jakowska has been making biochemical analyses of the diseased and healthy tissues in an effort to find out what is going on.

PUBLICATIONS OF INTEREST

WILD TIGERS AND TAME FLEAS. By Bill Ballantine. 344 pp., many black-and-white illus. by the author. Rinehart & Co., New York, 1958. $5.00.

Thirteen anecdotal chapters about animal trainers, Big Top and flea circuses, zoo animal acts, snake charmers – all the more flamboyant manifestations of the wild animal business. Delightfully written by a man who knows circus life from the inside.

WHOOPING CRANE. By Robert M. McClung. Illustrated by Lloyd Sandford. 63 pp. William Morrow & Co., New York, 1959. $2.50.

Another fine addition to the series of children's books by Mr. McClung. This is an exciting and accurate natural history story of one of our rarest American birc and will prove as instructive as it is interesting to th young reader. The layout is greatly enhanced by th fine black and white illustrations from the brush of th Zoological Park's staff artist, Lloyd Sandford. – DR.

NATURE STORIES FROM THE VIENNA WOODS. I Lilli Koenig. Foreword by Konrad Lorenz. Translated Marjorie Latzke. 159 pp., many photographs and drawing Thomas Y. Crowell Co., New York, 1959. $3.50.

After the last war Otto and Lilli Koenig and fiv other young biologists established an animal behavic research station at Wilhelminenberg outside Vienn These "Nature Stories" are charmingly human – bu not anthropomorphic – accounts of some of the birc and mammals under observation.

New Members of the New York Zoological Society

(Between January 1 and February 28, 1959)

Benefactor

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Associate Founder

Mrs. Paul Moore
Robert Thompson

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Announcing...

TWO CAMERA SAFARIS IN THE BRONX ZOO

The mornings of SATURDAY, APRIL 25

SATURDAY, JUNE 20

Here's a chance for Members with cameras—from Brownies to Leicas—to practice the art of animal photography under the genial and astute guidance of those two outstanding professionals, Staff Photographer Sam Dunton and the Society's Photographic Consultant Henry M. Lester.

Tours are limited to Members only (one person from a Member's family) and will be held rain or shine.

Starting time is 10:30 at the Members' Room in the Administration Building. Tours end at 12:30.

Members planning to attend should send in the attached postcard promptly.

Whether you are a professional or an amateur, these tours will be rewarding.